REMARKS

Claims 1-6, 8-10, 17, 19-25 and 31 are pending. Claims 1-6, 8-10, 17, 19-25 and 31 are rejected. Applicants amend claims 1-6, 8-9, 17 and 23, cancel claims 20-22, 24-25 and 31 and add new claims 33-41. Consistent with the claim treatment in the Office Action and previous Response to Restriction Requirement, Applicants have marked those claims not treated or examined as "Withdrawn."

Claim Rejections 35 U.S.C. § 103

Claims 1-3, 5, 6, 8-10, and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pat. No. 4,679,152 to Perdue ("Perdue") in view of U.S. Pat. No. 5,646,494 to Han ("Han"). Applicants respectfully traverse these rejections as set forth below.

Perdue is directed, generally, towards a robotic device configured to return to a charging station upon detection of a low charge status of a storage battery. Thus, Perdue, discloses, a single charge threshold for distinguishing between two stages of robotic operations.

Similarly, Han, is cited as teaching a reduction in energy use by the robotic device while returning to the charging station. Again, any change in robotic operations taught by Han are based on a single charge threshold.

In contrast, claim 1 is directed towards a method for energy management providing two different charge thresholds with different robotic operations below and above each of these levels. This results in at least three stages of robotic device operations.

Thus, Perdue and Han both fail to disclose multiple charge thresholds for controlling robotic operations. Specifically, neither, Perdue nor Han, alone or in combination, disclose a method for energy management in a robotic device including, as recited in amended independent claim 1:

> cleaning without seeking the homing signal when the quantity of energy is not below the high energy level; cleaning while seeking the homing signal when the quantity of energy is below the high energy level; seeking the homing signal

without cleaning when the quantity of energy is below the low energy level; and following the homing signal to return to the recharging base station when detecting the homing signal during seeking the homing signal.

Without such disclosure, the proposed combination of references does not support a prima facie case of obviousness. The noted distinctions are not insubstantial and without the benefit of applicants' disclosure, one of ordinary skill in the art in possession of the cited references, would not seek to provide three different operational stages based on two different charge levels. The traditional practice and rational has been that available energy should be used during a "full operations stage" until limited remaining energy must be conserved to ensure a complete "return to the charging station" during a "minimal operations stage." Absent applicants' disclosure, one of ordinary skill in the art would not be motivated to depart from this traditional single-threshold/two-stage practice, by use of an additional threshold splitting the "return to base station" into an extension of the "full operations stage" and alternatively of the "minimal operations stage." Applicants therefore request that the corresponding rejections be withdrawn.

Claims 17, 19-21 and 23-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Perdue in view of EP 1,331,537 A1 to Jones ("Jones"). Claims 17 and 19-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pat. No. 6,389,329 to Colens ("Colens") in view of Jones. Applicants respectfully traverse these rejections as set forth below.

Perdue is directed, generally, towards a robot-charger combination having three IR LED's mounted to either the robot or the charger and a robot-mounted sonar transducer. Perdue does not disclose an omni-directional emitter on a charger base station or alternate seeking and avoidance of an omni-directional emitter on a charger base station as a function of charge status.

Jones is directed, generally, towards a barrier signal transmitter for use in bounding an area to be traveled by a robot. The Jones barrier signal transmitter produces a linearly directed IR signal for triggering an avoidance routine in the robot. Alternatively, the Jones barrier signal

transmitter may produce overlapping omni-directional signals defining a barrier about an annular area for triggering an avoidance routine in the robot. Jones fails to disclose simultaneous following of a directional signal and avoidance of an omni-directional signal as a function of battery charge levels.

Colens is directed, generally, towards guiding a robot towards a charging station using one or two directional IR signals. Colens fails to disclose avoiding an omni-directional signal during one stage of operations and seeking it in anther stage as a function of charge status.

In contrast, claim 17 is directed towards a system having a base station with emitters for transmitting a guiding directional base station signal in combination with an omni-directional base station signal that is avoided by the robot when the robot is at a high energy charge level, and is followed at a lower energy charge level to permit docking. None of the art of record discloses or suggests such charge-level dependent responses to a combination of omni-directional and directional signals. Specifically, neither, Perdue, Jones nor Colens, alone or in combination, disclose, as recited in amended independent claim 17:

> a robotic device including a microprocessor configured to implement an avoidance behavior that measures the robotic device's energy level and instructs the robotic device to: avoid the omni-directional signal and follow the directional signal when the measured energy level is above a predetermined energy level, and seek the omni-directional signal when the measured energy level is below a predetermined energy level in order to dock with the base station for charging.

Without such disclosure, the proposed combination of references does not support a prima facie case of obviousness. The noted distinctions are not insubstantial and without the benefit of applicants' disclosure, one of ordinary skill in the art in possession of the cited references, would not seek to provide the unique simultaneous combination of both a directional guidance signal and an omni-directional avoidance signal. Applicants therefore request that the corresponding rejections be withdrawn.

New claims

Applicants add new claims 33-41. New claim 33 depends from claim 1 and is patentable for at least the same reasons discussed above with respect to claim 1. New independent claim 34 is directed towards an autonomous robot system configured to perform three-stages of operations based on two charge thresholds as similarly recited in independent claim 1. Claim 34 and its dependent claims are patentable for at least the same reasons discussed above with respect to claim 1.

CONCLUSION

It is believed that all of the pending claims have been addressed. However, the absence of a reply to a specific rejection, issue or comment does not signify agreement with or concession of that rejection, issue or comment. In addition, because the arguments made above may not be exhaustive, there may be reason for patentability of any or all pending claims (or other claims) that have not been expressed. Finally, nothing in this paper should be construed as an intent to concede any issue with regard to any claim, except as specifically stated in this paper, and the amendment of any claim does not necessarily signify concession of unpatentability of the claim prior to amendment.

Any fees that are due, such as excess claim fees, are being paid concurrently herewith on the Electronic Filing System (EFS) by way of Deposit Account authorization. Please apply all charges or credits to Deposit Account No. 06-1050, referencing Attorney Docket No. 09945-044001.

Respectfully submitted,

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